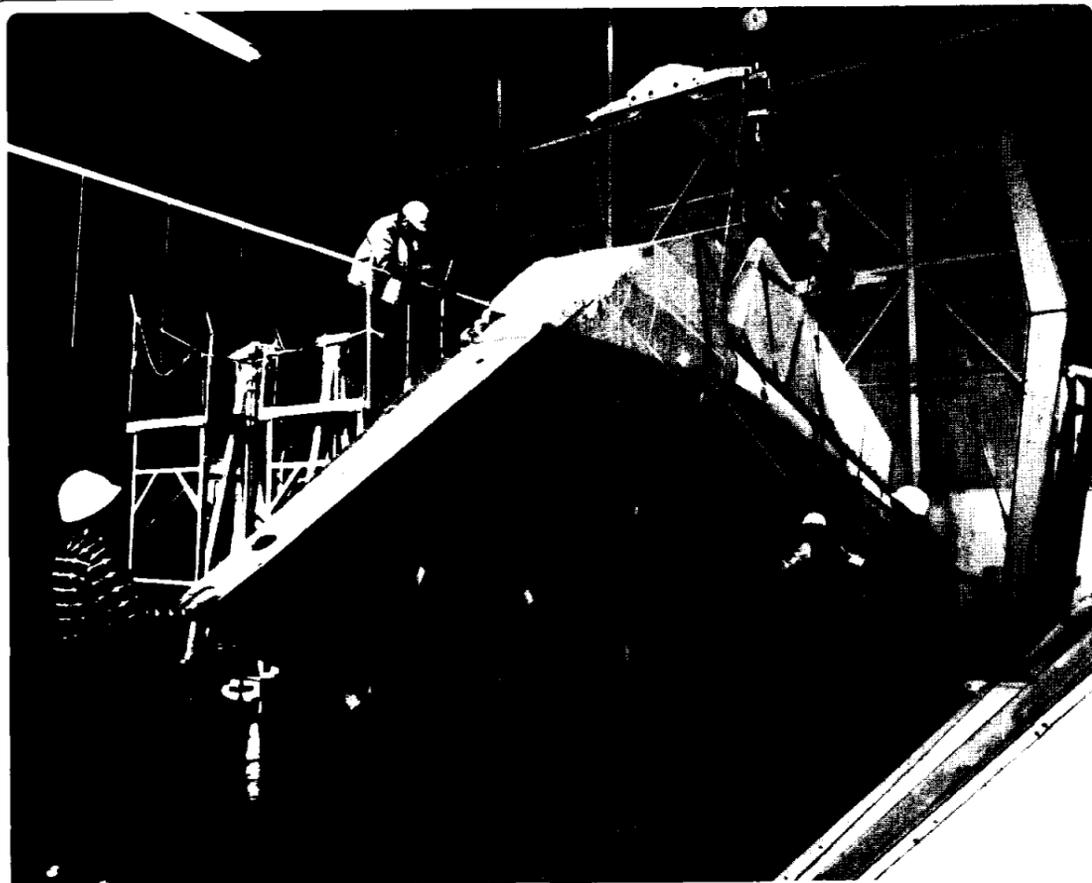


Space News Roundup

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National Aeronautics and Space Administration



NASA Photo

REPLACEMENT ORBITER PROGRESS—Workers at Rockwell International's assembly facility in Palmdale, Calif., spot for a crane as it hoists Orbiter 105's vertical stabilizer. The stabilizer was placed in a holding fixture, and is being sanded in preparation for Thermal Protection System application.

Rodney lists safety concerns

Solid rocket recertification 'most singular' problem

By Beverly Green

Recertifying the solid rocket motors, reworking the 17-inch disconnect valve and certifying the Space Shuttle's main engines are the key safety concerns that remain in STS-26 preparations, according to NASA safety officials.

"The entire recertification of the solid rocket motor has to be our most singular problem," said George Rodney, associate administrator for safety, reliability, maintainability and quality assurance, at a recent press conference. "It is not one that is easy because it is a very expensive process to fire one of those motors."

"We have to complete the hazard analysis exercise, close out problem

reports on all the elements, and modify some familiar tests such as the SRM," Rodney said.

Communication is an issue we must continue to work, he said. "People are the key to any organization. We've been working on morale and motivational issues and manned flight awareness as well as quality and safety awareness."

Clarification of roles and responsibilities has improved the safety organization, along with the hiring of new talent, he said.

"Since 51-L, there has been about a 30 percent increase in SRM&QA civil service personnel," Rodney said.

Considerable effort has been made to encourage openness among employees and quicken the

flow of information between the ranks. A NASA safety reporting system has been instituted to supplement the regular reporting system. "It has been designed so that anybody who feels they cannot get a message through our normal systems can communicate with management and maintain anonymity. It is still a trial program, but I think it will provide us with an added assurance that nothing slips through the cracks," Rodney said.

The kind of issues employees have been raising through the safety reporting system are routine and there have been no blockbuster reports. "Most cases are in regard to lighting in a work area or a work platform deficiency. There have

(Continued on page 2)

New target date puts first flight in early August

The new target launch date for STS-26 is August 1988, and internal schedules will focus on a planning date of Aug. 4, Rear Adm. Richard Truly, NASA associate administrator for space flight, said Wednesday.

The schedule change follows a major program assessment spurred by the December full-scale firing of the redesigned solid rocket Development Motor-9 (DM-9), and an initial assessment of recent weld inspections of solid rocket motor (SRM) aft skirt hardware at KSC.

The solid rockets flown with *Discovery* on STS-26 are expected to use the nozzle outer boot ring configuration tested successfully during the DM-8 firing in August 1987. Test firings planned before STS-26 will further evaluate the DM-8 boot ring configuration. The STS-26 aft segments, which contain the outer boot ring, will arrive at Kennedy Space Center in early March.

A recently instituted ultrasonic weld inspection had detected a small void in a low-stress area of the left-hand STS-26 SRM aft skirt hardware that anchors the assembled Space Shuttle during roll-out and main engine ignition. Structural analysis validated program officials' early optimism about the situation, and both skirts are in the process of being cleared for flight with no additional schedule impact.

"We know what it is, we've got time to work on it, I don't think it's going to be a major schedule driver," said Richard Kohrs, Deputy Director of the NSTS Program at JSC.

Kohrs said a separate weld problem suspected inside the Space Shuttle main engines being readied for STS-26 can be corrected without affecting the schedule. The problem involves the so-called "fish-mouth seal," a Criticality 1 piece of hardware inside the main engine's high-pressure fuel turbopump. The seal controls the amount of hot gas flow around the turbopump's first-

stage turbine blade and balances the engine for efficiency, Kohrs explained.

During a routine overhaul, technicians discovered an incomplete weld. Further investigation found a number of suspect seals, all made about the same time, Kohrs said. The three STS-26 flight engines contain pumps made during that period.

"With the criticality of that piece of hardware, it just makes sense to go change it," Kohrs said.

Pumps containing the suspect seals will be removed from the STS-26 engines, he said, and will be replaced with pumps that have seals with 100-percent welds. Each pump will be test-fired for 250 seconds before installation into the flight motors, he added.

Three full-scale, full-duration solid rocket test firings are planned before STS-26. Qualification Motor-6 (QM-6), planned for April 7, will incorporate "manufacturing-type" flaws into the test hardware. Plans do not include any test flaws in QM-7, targeted for firing June 9. QM-7 will be fired on the new test stand at Morton Thiokol's Wasatch Facility in Utah and will include dynamic side loading as part of its test objectives.

Production Verification Motor-1, scheduled for July 6, will be a constraint to the STS-26 launch and will purposely contain necessary test flaws to demonstrate design margins of the redesigned case-to-case field joints and case-to-nozzle joints.

Test flaws introduced into all full-scale motors will have been tested previously in joint demonstration test articles at the Joint Environment Simulator Facility at Morton Thiokol and/or the Transient Pressure Test Article Facility at Marshall Space Flight Center.

In support of the new target launch date, it is planned that *Discovery* will be rolled out to KSC (Continued on page 2)

New vendor declares soft-drink price hiatus

ARA Services, Inc., is taking over the JSC vending machine concession, and is giving employees a 5-cent reduction on all canned soft drinks for six months.

The ARA Services contract agreement runs from Jan. 6, 1988, to Jan. 5, 1989. The out-going vendor is Service America Corp., which was first awarded the contract in 1982.

Alma Martin, acting manager of Exchange Operations, said the vendor transition will begin Feb. 1, and should be completed by the week of Feb. 15. All vending machines now on site will be removed and replaced with machines supplied by ARA, she said.

"While there may be some inconvenience to employees as the new vendor assumes operations and vending equipment is being changed out, we hope to

keep it to a minimum and request your forbearance and cooperation," Martin said.

ARA offers a large selection of name-brand products, utilizes up-to-date vending equipment and has an established quality assurance program for both vending machines and product freshness, Martin said.

The six-month drink price reduction will reduce the cost of a 12-ounce canned soft drink from 55 cents to 50 cents. At the end of the introductory offer, the price will return to 55 cents, Martin said.

ARA also plans to institute an additional promotional sales plan revolving around canned drinks, and details will be announced later.

Martin reminded employees that the Bldg. 11 cafeteria has been reopened following replacement of its ceiling.



JSC Photo by Bill Blunck

JSC employees enjoy lunch under a new ceiling in the recently reopened Bldg. 11 cafeteria. The cafeteria was reopened Jan. 21 following approximately three months of refurbishing.

Challenger remembered

JSC employees observed the second anniversary of the Jan. 28, 1986, *Challenger* accident by remaining silent for 73 seconds in honor of all astronauts who have died while serving the United States space program.

The same U.S. flag that was flying in front of Bldg. 1 when *Challenger* was launched was lowered to half-staff at 10:38 a.m., and remained at half-staff until dusk.

In a memo, NASA Administrator James C. Fletcher reminded JSC officials that Jan. 28, 1988, had been designated by Congress and President Reagan as a "National Day of Excellence" calling on Americans to "... pursue the spirit of excellence represented by the crew of the Space Shuttle *Challenger*..."

"Regardless of how we remember this day," Fletcher wrote, "We all share the knowledge that it is forever etched in our minds and hearts."

Space News Briefs

Colladay to direct defense research agency

Dr. Raymond Colladay will leave NASA on Feb. 1 to become director of the Defense Advanced Research Projects Agency (DARPA). As associate administrator, he was responsible for direction of NASA's aeronautics and space research for technology development programs and for the institutional management of NASA's Ames, Langley and Lewis research centers.

Association of Space Explorers-USA names directors

The Association of Space Explorers-USA, part of a non-political, professional society of 52 astronauts and cosmonauts from 16 countries, has welcomed new directors Tom Stafford, Charles Conrad, Jr., Buzz Aldrin, and Charlie Walker to its board. Taylor Wang was named president, Rusty Schweickart vice president and Charlie Walker, treasurer. The new board met Dec. 17 to prepare to implement several ASE Congress-approved international cooperation recommendations.

Supernova computer bulletin board begun

The Space Telescope Science Institute, by arrangement with the Information Systems Office and the Astrophysics Division at NASA Headquarters, has established the Astronomy Information Service (ASTIS) to provide a forum where observers and theorists can discuss and share new developments. This bulletin board utilizes electronic mail to provide supernova researchers with a speedy alternative to written communications. Astronomers can access ASTIS through SPAN, ARPA Internet, X.25 and NASA Science Internet.

MIR watch hotline now available to public

Anyone in the continental United States can now call the National Space Society's Mir Watch Hotline, (202) 546-6010 between 8:30 a.m. and 3:30 p.m. CST to find out the best time to see the Soviet space station Mir pass overhead.

Lockheed forms satellite operations company

Lockheed has formed a new company dedicated to supporting the Consolidated Space Test Center located at Onizuka Air Force Base in Sunnyvale, Calif. Lockheed Technical Operations Co. (LTOC), a subsidiary of Lockheed Missiles & Space Co., provides uninterrupted satellite command and control with 1,000 employees. Sam Araki, president of Lockheed's Space Systems Division, is president, and Dan Tellep, president of Lockheed Missiles & Space Systems Group, is board chairman.

American Space Network gearing up

The American Space Network, a new television network devoted to advances in aviation, space and astronomy, is gearing up for 24-hour satellite transmission. The network's creators are expecting major cable distributors to pick up the service.

Bulletin Board

Black History Month observed Feb. 10 and 26

The JSC/Black Cultural Association will observe National Black History Month with two programs focusing on this year's national theme, "Constitutional Status of Afro-American into the 21st Century." Activist Dick Gregory will be keynote speaker at the first program, from 9:30 to 11:30 a.m. Feb. 10 at the Gilruth Recreation Center. Historian and author the Rev. Dr. Ishakumasa Barashango will speak at the second program, from 1:30 to 3 p.m. Feb. 26 at the recreation center. Artifacts will be displayed throughout the month in the Bldg. 45 Technical Library. All JSC civil service and contractor personnel are invited to attend.

Clear Lake's Space Society to meet Feb. 9

The Clear Lake Area Space Society, a chapter of the National Space Society, will hold its next meeting Tuesday, Feb. 9 at 7:30 p.m. in Rm. 222 of the Gilruth Recreation Center. For more information, call Chuck DiFalco at x31701 or 333-3763.

Conestoga rocket is next Lunch and Learn topic

The AIAA Space Systems Technical Committee will host a lunch and learn meeting from 11:30 a.m. to 12:30 p.m. Feb. 16 in the Bldg. 3 cafeteria. The speaker will be James Davidson, manager of Space Services, Inc. The topic will be "Conestoga II: Small Launch Vehicle of Tomorrow." For more information call Andre Sylvester, x31537, or Michael Laible, 282-2785.

Artificial intelligence is videoconference subject

The IEEE Education Committee will sponsor a videoconference from 10:30 a.m. to 2 p.m. Feb. 18 in the Gilruth Recreation Center. The topic will be "Practical Applications of Artificial Intelligence." Registration deadline is Feb. 11. JSC and contractor personnel are invited. For details and registration call Nancy Marshall, x30174.

Area Macintosh Users meeting scheduled Feb. 1

The next NASA Area Macintosh Users (NAMU) monthly meeting will begin at 7 p.m. Feb. 1 in the RSOC cafeteria, 600 Gemini. Assistance will be available for new users. Hardware and software will be demonstrated and questions will be answered. The free meeting is open to the public.

Professional Secretaries to meet Feb. 10

The Clear Lake/NASA Area Chapter of Professional Secretaries International (PSI) will meet Wednesday, Feb. 10. The social meeting and dinner will begin at 5:30 p.m. followed by the program and business meeting at 7 p.m. The speaker will be Joel Dunlap from Crime Protection Consultants. This meeting will cover crime in areas of home, street and automobile. Anyone interested in attending is invited to do so and may call Beverly Anderson, x32042, for more information.

Rodeo Run 10K scheduled Feb. 20

The Rodeo Run 10K will be Feb. 20. The race goes from downtown Houston to the Astrodome in front of the rodeo parade crowd. NASA and Air Force personnel interested in joining the NASA-JSC Corporate team should call Capt. Rodriguez, x38669, for sign-up information.

Gilruth Center News

Call x30304 for more information

EAA badges—Dependents and spouses may apply for photo I.D. badges between 6:30 and 8:30 p.m. Feb. 6, 16 or 22

Defensive driving—Course is offered Feb. 20 from 8 a.m. to 5 p.m. and costs \$20.

Weight safety—Required course for employees wishing to use the Rec Center weight room will be Feb. 10 and Feb. 25. Cost is \$4.00.

Physical Fitness—The next 12-week course of the JSC Physical Fitness Program will be from 11 a.m. to noon or from 4 to 5 p.m. April 4 to June 24. All NASA and contractor employees and dependents are eligible upon completion of an acceptable physical exam and a maximal treadmill stress test. For more information call x30301.

Aerobics—Low-impact aerobics classes begin Feb. 16 and will meet every Tuesday and Thursday for 8 weeks from 5:15 to 6:15 p.m. Cost is \$24.

Agencies cooperate on new launch system

President Reagan has signed a report to Congress creating a joint NASA and Department of Defense program for development of the Advanced Launch System (ALS).

The ALS is intended to provide a launch system that meets long-term national launch needs; is flexible, reliable and responsive; and significantly reduces the costs of launching payloads into space. The program expects to reduce costs in all elements of the space launch system including the launch vehicle, manufacturing, launch processing, logistics, data management and automation.

The basic approach calls for

completion of ALS design requirements and use of government and industry expertise in all phases of the program with emphasis on maximum competition.

The report specifies that DOD and NASA work together to define and develop ALS, the program's design approach, management plan, costs and test facilities.

The management plan creates a joint program office headed by an Air Force program manager with a NASA deputy program manager. This office currently exists at the Air Force Space Division in Los Angeles, Calif.

In the management structure,

DOD will manage the systems engineering and integration, vehicle, logistics and payload module. NASA will manage liquid engine systems and focused technology efforts.

DOD will accept full funding responsibility for the program with any unique civil requirements, not addressed by the ALS baseline, being funded by NASA.

The ALS will make maximum use of Government testing facilities to meet ALS requirements. As the program matures and concepts are further developed, specific facilities will be selected for testing based on capability and availability.

NASA selects small business researchers

NASA has announced selection of 26 research proposals for negotiation of Phase II contract awards in its Small Business Innovation Research (SBIR) program. Included are 25 small, high technology firms located in 14 states.

JSC will manage two of the Phase II research projects, which brings to 12 the number of SBIR contracts to be negotiated at JSC.

Selections were chosen competitively from 154 proposals submitted for Phase II continuations of SBIR Phase I projects initiated in 1986. The 26 selections, valued at approximately \$12 million, add to 59 selections announced on Dec. 10, and bring the value of the total group of 85 selections to approximately \$40 million.

SBIR objectives are to stimulate technological innovation, increase small business participation (including minority and disadvantaged firms) in federal research and development programs and contribute to growth and economic strength of the private sector.



JSC Photo by Bill Blunck

HELICOPTER HOUSE GUESTS—Helicopters carrying 20 award-winning servicemen from Fort Hood set down on a JSC parking lot. Twenty servicemen, winners of their base's Military Personnel of the Year award, visited JSC and toured the Mission Control Center on Jan. 21.

Solid rocket tests to precede launch

(Continued from page 1)

Launch Pad 39B on May 13. A Flight Readiness Firing of *Discovery's* main engines and liquid propulsion system is targeted for June 13.

"The performance of the entire NASA/contractor team over the past month, during the conduct of this major review of the entire Shuttle recovery program, has been outstanding," Truly said. "It has clearly demonstrated that we have struck

the proper balance between our first priority of safety and quality, while still maintaining our commitment to return the Space Shuttle to flight just as quickly as we can reliably do so."

Rodney lists remaining safety concerns

(Continued from page 1)

not been significant flight hardware-type problems," he said.

A format that withholds witness accounts some months until a final report is assembled, used by the Department of Defense, eventually will be adopted by SRM&QA. "We have not yet officially adopted this format because we want to make sure that people are free to talk. If they think they will be subject to subsequent legal action, they become reticent about talking," he said.

Other systems implemented have been helpful in identifying areas that need refinement. "Some time ago we had a lift of a valuable piece of hardware and it worked perfectly but as it turned out after the lift was complete, we found some key bolts left out of the lift assembly. It didn't result in an accident but we are treating it as an accident and taking corrective action."

By mid-year the partially automated mishap reporting and corrective action system utilized

throughout the agency will be completely automated.

"Risk management is the crux of our business. We have several small teams working systems assessments which provide for a totally independent assessment of problems. We have also been working the overall risk management in the agency so that we are sure we have a good cohesive program that will be understandable to those both within the agency and externally," Rodney said.

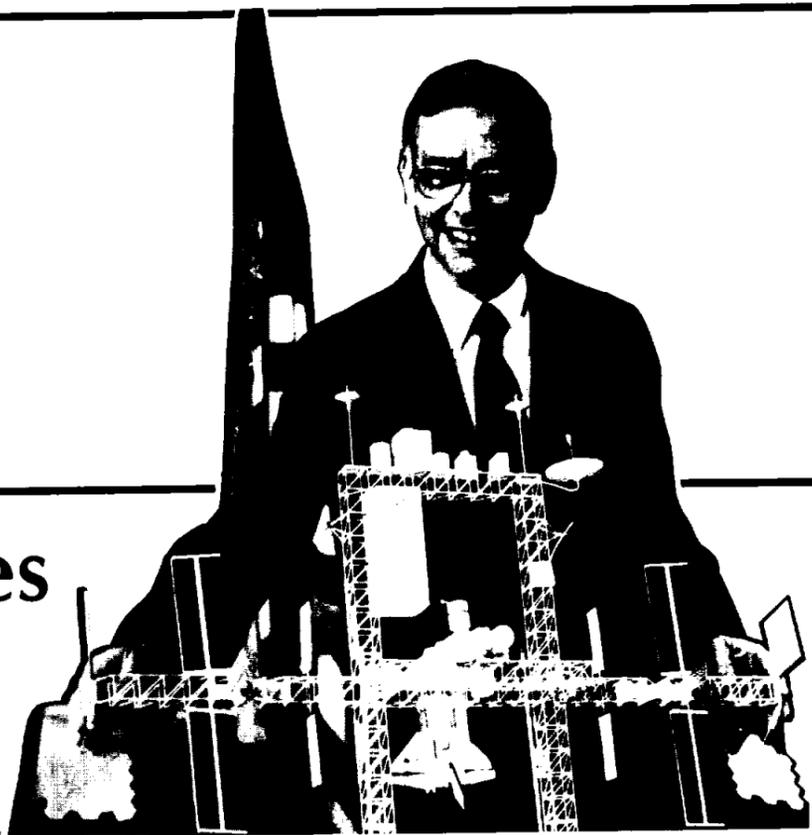


JSC Photo by Benny Benavides

ASIAN DANCE—Members of the Chinese Dance Academy perform in JSC's Bldg. 2 auditorium during Asian Pacific American Heritage Day. Performances, speeches and workshops on Jan. 22 honored Col. Ellison Onizuka, the first Asian American astronaut.

AARON COHEN

JSC's director discusses recovery, safety and the center's future



[Editor's note: Aaron Cohen has been director of Johnson Space Center for more than a year. On this, the day after the second anniversary of the Challenger accident, Roundup asks him to review our progress toward a return to flight and to reflect on JSC's future.]

By Kelly Humphries

Roundup: As center director, you have a unique perspective overlooking all the work going on here at JSC. How would you assess the progress of our Space Shuttle return to flight efforts? Where is the going smoothest, and where is it roughest?

Cohen: After the Challenger accident, the Rogers Commission made its report, and we've responded to the report. We've made a great deal of progress. The center recognizes that the most important thing we have to do is return the Shuttle to safe flight. That has got to be our number one job. The employees know it, the contractors know it, and they are working together as a team to get the job done. Every organization at the Johnson Space Center is involved in the teamwork required to return the Shuttle to safe flight.

The flight control team is prepared to fly; the software ready. The flight crew is in training. Tremendous effort is going into completing the Failure Modes and Effects Analysis, getting the new hardware certified, closing open problems and tracking the vehicle in its checkout and flow at the launch site.

When you look across the entire program, Marshall Space Flight Center is getting the main engines ready, the external tank, the solid rocket motor, and Kennedy Space Center is checking out the vehicles and preparing the total stack. Everyone is working together closely with their contractors. There's teamwork, everybody senses we are making progress in returning the Shuttle to safe flight. Overall, the picture is very upbeat, people are very positive about it and there's a great deal of progress being made.

That isn't to say, though, there is not work to be done. We've got to go through a design certification review. Once we complete that review we will be ready to fly.

Flight safety

Roundup: Flight safety has always been one of the most important aspects of our work here at JSC. During the past two years, safety has been emphasized even more. What, specifically, is JSC doing in this regard?

Cohen: Safety has always been foremost in our minds. Safety starts with everybody paying attention to detail. If you encourage engineers, operators, and contractors as well as the safety and reliability organization to pay attention to detail and promote the feeling they can bring problems forward, then safety becomes an integral part of the program.

We have strengthened our safety organization in the number of people. We've encouraged people to pay attention to detail. I think in that regard we have stressed safety, but that isn't to say that we have not always been safety conscious.

Communication

Roundup: One Rogers Commission recommendation involved improved management communication. The Mission Operations Directorate's recent Hay Committee report stressed management-employee communication. What is being done to improve communication at JSC?

Cohen: Communication is the essence behind success. In any survey we've performed, it always indicates you can better your communication, and that's true. There's no simple way to get good communication. The thing we're doing today—our interview—

and then printing it in the paper, is good communication. Encouraging supervisors to talk to their employees and counsel them is good communication.

Periodic staff meetings are important. Increasing the publications, such as having the Roundup come out every week rather than every two weeks, is important. Better use of electronic communications is important. I don't think you can do too much in communication. I don't think we can do too much in trying to make our communication better.

Probably one of the most important elements that you get out of strategic planning is better communication. In fact, strategic planning encourages teamwork and a better understanding of how everybody is doing their job.

Morale

Roundup: Many people outside the center seem to believe that launch schedule delays are hurting employee morale. From your viewpoint, how high or low is morale at JSC?

Cohen: I think morale is very good at Johnson Space Center. I think it's very upbeat. We know we are going to fly, we're going to return the Shuttle to safe flight so the morale is high. We know what we have to do, our contractors know what they have to do. I've also got to say, though, that morale is not going to be perfect until we fly. We are at Johnson Space Center to put humans into space. Once we fly morale will be even higher, but that's not to say it is not good today.

Space Station

Roundup: Goal 2 of the Strategic Game Plan you mentioned earlier is to develop the capabilities needed to build and deploy a Space

Station. How do you think the recent budget cuts will affect implementation of that JSC goal?

Cohen: What we got in 1988 for the Space Station lets us get started. We're going to have to start slower than we had planned. The key budget is going to be the '89 budget. We have good support and feel confident we will earn an adequate budget in '89.

'88 Budget

Roundup: How will NASA's 1988 funding affect the rest of JSC?

Cohen: I think in general, the '88 funding looks very good for us. In 1988, we get funding for new facilities and equipment. So, I would say that everything considered the '88 budget looks very good to us.

Construction

Roundup: Work is under way on two facility additions at JSC, the 9B addition to the one-gravity training facility and the Central Computing Facility. When will those projects be complete? Are other projects planned in the near or far future?

Cohen: The construction of the facility for the mockup laboratory for Space Station, the so-called Building 9B, is scheduled to be completed in May of 1988. The Central Computing Facility is scheduled to be completed in November of 1988. These are two major facilities. In fact, this is the most construction that's gone on here in one year since the middle '60s.

We do have two other facilities that look very promising to us, although they haven't been approved—the Mission Control Center for Space Station support and the Space Station simulator and training facility in Building 5.

We're also trying to get the Neutral Buoyancy Laboratory, a larger Weightless Environment Training Facility, approved. We haven't gotten that approved yet, but we think it's needed.

Technologies

Roundup: Besides Space Shuttle and Space Station, what other JSC projects deserve special emphasis?

Cohen: You might break that into projects and technologies. Let me start with technologies. I think it's very important for this center to work on the enabling technologies that will allow us to do the more futuristic programs that this country sets out to do. One of the key areas that we must work on is the extension of humans' capabilities in zero-G. If you're going to explore space, you need to understand that. The technologies for a closed-loop environmental control system are very important for future space exploration. More sophisticated data management systems, tracking and communications systems are also important, as are structures. Those are just some of the more important enabling technologies.

The programs that are important are the studies we are doing with the new Exploration Office in Headquarters in studying the human lunar base and the human Mars mission. Of course, a forerunner to that is the Mars rover sample return mission, which also extends some of our technological capabilities, as does the Aeroassist Flight Experiment.

We also have some interesting science projects that I think have very far-reaching effects. One is the cosmic dust collection project. Another is biotechnology work. We are working on the Crew Emergency Return Vehicle for Space Station. We also have an interesting activity going on in the operations organization, which is the operations of the Orbital Maneuvering Vehicle with the Marshall Space Flight Center. So you see, we have a lot of activity going in areas over and above the Shuttle and the Space Station.

"The center recognizes that the most important thing we have to do is return the Shuttle to safe flight. That has got to be our number one job. The employees know it, the contractors know it, and they are working together as a team to get the job done."

—Aaron Cohen

Roundup Swap Shop

All Swap Shop ads must be submitted on a JSC Form 1452. The forms may be obtained from the Forms Office. Deadline for submitting ads is 5 p.m. the first Wednesday after the date of publication. Send ads to Roundup, AP3, or deliver them to the Newsroom, Bldg. 2 Annex, Room 147. No phone in ads will be taken.

Property & Rentals

Lease: Middlebrook, 3-2-2, split, new carpet, appliances, fans, garage door opener, extras, near Armand Elementary, \$675/mo. Don, x35851 or Donna 280-1000.

Sale: Ryland Blanco, 2025 sq. ft., 3-2-5-2, wet bar, loft, FPL, neutral colors, fans, gas grill, landscaped, new fence, \$76,500. x35449 or 480-2313.

Sale: League City, country home 1.33 acres, 3-2, huge garage/carpport, all electric, deep well, near 146, Kemah area on Delesandri St., \$85,000. 334-1883.

Sale: Kemah, 1.5 acre lot on Kemah Drive, some trees, high elevation, \$8,300. 334-1883.

Sale: Kirkwood south, large custom 2 story, 4-2-5-2, formals, family room w/FPL, intercom, walk-in closets, new 4-ton, AC, oversized cul-de-sac lot, \$81,500. Al, 488-5210.

Sale: Dickinson, 2-2-1, large lot, pool, enclosed patio, fence, \$28,900. Phyllis, 282-4306.

Sale/Lease: El Dorado Trace, 1 BR, 1 study, new carpet, appliances, refrigerator w/ice maker, pool, tennis, whirlpool, no pets, downstairs, \$32,000 or \$350/mo., deposit. 480-1492.

Sale: Galveston time-share condo, one week at Four Seasons on the Gulf, on seawall, week May 20 best time of year, exchange network membership, \$7,500. Jeff, 282-7744 or 996-1907.

Lease: Nassau Bay, 3 BR, den, family room, formal living and dining, walk to NASA, \$600/mo., deposit. Duke, 488-4493.

Sale: University Green, 2 story townhome, 2-2.5-2, gas heat, FPL, fenced, large corner lot, porch, near NASA, UH, \$63,500. Dennis, 480-5273.

Lease: El Lago condo, 2-2, carport, W/D, FPL, on waterfront property, \$425/mo. 326-4938.

Sale: Shelby County, Tx., 2,000 ft. brick, 30 plus acres, near lake, extras, Nacogdoches. 488-6169.

'84 mobile home, 2-2, 14 x 70, extras. Michelle, x31165.

Sale: Heritage Park, 3-2-2, 1,500 sq. ft., new paint, carpet, garage doors, P&I \$400, \$48,000, 5% down. L.T. x35596 or 481-0289.

Lease: League City, Newport subdivision, 3-2-2, FPL, built-ins, new carpet, fan, covered patio, fenced, near Clear Creek schools, NASA, references required, \$495/mo. 488-6306.

Lease: Galveston beach house, 2-2, beach 100 yards, boat landing 4 blocks, marina w/pool, \$500 week, weekend rates available. Fendell, 481-0679.

Sale: Clear Lake City, 3-2-2, broker-owner, new vinyl flooring, stain-master carpet, FPL, fans, remodeled kitchen, microwave, custom cabinets, screened patio, built-in gas grill, located on park, pool, tennis, near Whitcomb Elementary, \$68,000. x30020 or 488-5390.

Lease: Jackson Hole, Wyoming, condo, ski, 6 days, 7 nights, begin March 7, \$500. Bob, x34325.

Lease: CLC Cloisters condo, 2 BR, W/D, microwave, FPL, patio, security, wet bar, \$560/mo., deposit. x34360 or 537-9480.

Sale: 3.29 acres, 1 BR cottage, den, hardwood floors, new carpet, FPL, secluded, tranquil, 5 mi. from NASA in Seabrook, \$97,000. Munford, 532-4784.

Lease: Lake Livingston waterfront house, 3-2, fully furnished, pier, ex. fishing, skiing, swimming, weekend, weekly rates. 482-1582.

Sale: Friendswood, Sun Meadows Estates, beautiful wooded lot, cul-de-sac, bordered by stream, golf course on both sides, 210' deep. Doug, x32860.

Lease: West Galveston beach house, 3-2, central A/H, day/week. Shumilak, x37686 or (409) 737-3520.

Sale: 3-3-3, 1 acre, built-ins, trash compactor, disposal, FPL, shed, fence, pool, no city taxes, extras, \$68,000. 337-2680.

Sale: 13.5 acres, gently rolling wooded east TX land, fronts county blacktop, near Tyler and Henderson, assumable low cost TX Vet. loan. McLeaish, 480-7445.

Pearland Park, mobile home, 14 x 70, 3-1.5, miniblinds, appliances, skirted, ex. cond., appraisal \$12,500, sell \$7,500. Michael, 280-7344 or 485-5339.

Cars & Trucks

'79 Chevy Monte Carlo, good cond., \$1,500. 644-0315.

'86 Mazda RX7, rotary, 17K mi., 5 spd., AM/FM/cassette, AC, power sunroof, rear window louvers, silver/blue, ex. cond., \$13,000 OBO. 480-0907.

'82 Mercury Capri, 6 cyl., auto., PS, PB, A/C, AM/FM/tape, cloth interior, 44K mi., ex. cond., \$3,450. Bob, x39079 or 488-5881.

'75 Ford LTD, 2 dr., 460 engine, good cond., \$400 OBO. 538-1186.

'82 Dodge custom pickup, 6 cyl., 4 spd., cruise, AM/FM/tape, chrome wheels, bumpers, leap cap, ex. cond. \$3,795 or trade on van. 333-2468.

'86 Mazda, 2 dr., 5 spd., 2 liter, fuel injection, AM/FM/tape, cruise control, 11K mi., silver/blue, ex. cond., \$8,495/trade on custom van. 333-2468.

'70 Chevelle Malibu, 99% restored, new 350 motor, red w/black strips, \$6,000 OBO. 280-1982 or 332-7081.

'80 Pontiac Firebird Formula, 4.9 Turbo, auto, mag wheels, AM/FM/tape, full power, new tires, low miles. 474-4885.

'77 Grand Prix, green, 2 dr., \$950. Mike, 532-1793.

'79 Toyota Celica Supra, new IROC, blue, new tires, recently replaced engine, good cond., needs transmission work, \$2,000 OBO. Roy, x37185 or 668-3100.

'67 Mustang, 3 spd., 289-V8, new paint, AM/FM, good tires, air shocks, headers, good cond., \$2,995. Michael, x38169 or 482-8496.

'85 Plymouth Reliant, 4 dr., auto., stereo AM/FM, AC, silver, dark red interior, ex. cond., \$3,500. Bob, x32193 or 332-3817.

'61 Chrysler Windsor, radio, heater, air, collector's car, \$3,950. 486-4466.

'81 GMC Sierra Classic pickup, 87K mi., blue/silver, camper shell, good cond., \$2,800 OBO. Phyllis, 282-4306.

'76 Chevy Caprice, 350 V-8, ex. mechanical cond., front body damage, \$300 OBO. Jim, x31433 or 488-4459.

'87 Volvo 240 DL, 5 spd., gold metallic, brown interior, tinted windows, AM/FM/tape, 4 speakers, PL, ex. cond., \$13,900. David, x31339 or 338-2763.

'80 Olds Toronado, power moonroof, Kenwood cassette, loaded, 67K mi., \$2,995. Jerry, x38922 or 333-9003.

'82 Mazda GLC, 3 dr., hatchback, 5 spd., AC, sunroof, AM/FM/tape, ex. cond., \$2,100. Joe, x33559 or 996-1667.

'86 Monte Carlo SS, maroon, all electric, AM/FM/tape, tinted windows, rear window defogger, low down payment, take up notes. Michelle, x31169.

'80 Chevette, auto., good tires, AM/FM/tape, good cond., \$1,000. Geraldine, x33915 or 337-5437.

'86 Mustang GT, loaded, T-top, tinted windows, PW, door locks, AM/FM/tape, ignition disable theft protection, garaged nightly, \$9,000. Steve, x33356 or 480-1905.

'71 Ford wagon, 400 V8, 127K mi., CD ignition, manuals, needs paint, \$750. Brown, x31604 or 333-3103.

'82 Mercury Capri, 6 cyl., auto, PS, PB, AM/FM/tape, cloth interior, 44K mi., ex. cond., \$3,450. Bob, x39079 or 488-5881.

'86 Delta 88 Royale, 3.8L, 27K mi., loaded, maroon, \$9,800 OBO. Ray, x30823 or 554-5434.

'73 Chev Sportsvan, \$500 OBO. Haines, 941-2495.

'86 Ford Ranger Supercab, V6, loaded, 8,400 mi., \$8,900. Bud, x33497 or 480-9363.

'85 Dodge Caravan LE, AC, AM/FM, power doors, windows, gold dust color, velour interior, trailer hitch, ex. cond., \$8,750. 331-5751.

'84 Ford Tempo, 2 dr., PS, PB, AC, AM/FM, cruise, new tires, brakes, battery, 38K mi., non-smoking owner, \$4,400. x38004 or 554-2209.

Boats & Planes

'72 Wellcraft 18' 140 Johnson trailer, (2) 16 gallon tanks, power winch, \$3,495. Don, 331-2422.

'81 90 hp Evinrude motor, power tilt, low hours, on 17' Glastron '71, galv. trailer, \$1,500. 337-1027

Grumman 17' aluminum canoe, ex. cond., family style, rides high in the water, stable, paddles, life jackets, \$300 OBO. Roy, x37185 or 668-3100.

'80 21' Chaparral, 470 Mercruiser I/O, cabin, diving platform, top w/curtain enclosure, Marine radio, CB radio, SS, prep, porta-potty, equipped fob, \$6,995. Max, x33286 or 337-5760.

15' Arrow Glass ski boat, trailer, w/o motor, \$995. Debbie, x30169 or Hugh, 554-7442.

'55 F35 Beech Bonanza, 4000 TT-100SETOH, full 1 FR thru DME w/auto-pilot, new paint, interior, windshield, \$18,900 OBO. 470-8090 or 470-8720.

NACRA 5.8, 19' catamaran, will show how to rig and provide tuning tips on first sail, tapered mainsheet, mast rotator, galv. trailer, extras. \$3,200 OBO. 486-4545.

Cycles

'87 touring bike, ex. cond., \$175 OBO.

'78 Honda CB550K, runs but needs work, \$400. Brad, x31678 or 338-1252.

Ladies' Raleigh 3-spd. hub gear bicycle, 26" wheel, 21" frame, \$45. 532-3342.

'85 Honda 700 Sabre, black/grey,

matching Hondaline fairing, cruise control, cover, 12K mi., \$2,200. 480-4434.

'83 three wheeler, Honda ATV. Michelle, x31165.

Audiovisual & Computer

Ashton Tate's D-base for MacIntosh, \$350, new. Susan, 280-8006.

Apple II Plus, 2 drives, monitor, paddles, software, \$400 OBO. Jeff, 282-7744 or 996-1907.

Custom-built stereo speaker system, 2 satellite speakers, subwoofer, \$250. Bud, x33497 or 480-9363.

Household

Full motion queen-sized waterbed, bookcase headboard, 6 drawers underneath, heater, bumper pads, mattress pad, sheets, ex. cond., \$225. 331-7360.

Kenmore washer, apt. size, heavy duty, ex. cond., \$150. Sylvia, x32189 or 334-2824.

Full motion king-sized waterbed, bookcase headboard, heater, \$100. Fred, x33150 or 532-1179.

Canopy bed, white, twin-sized mattress, box spring, matching bedspread, pillow cases, \$125. 480-2870 or 333-6449.

2 twin box springs, ex. cond., \$50 ea.: Sears Kenmore deluxe microwave, 1.4 cu. ft., 3 stage, accessories, \$175. 532-1673.

Sofa, light blue print, \$300 OBO; coffee & end table, glass insert, \$100 OBO; queen-sized bed, \$100 OBO. Ray, x32677 or 554-5434.

Refrigerator, 17 cu. ft., Admiral Dual Temp 17, frostless, freezer on top, \$75 OBO. Dennis, 483-9012.

Queen-sized waterbed, mattress, frame, heater, \$75 OBO. Rick, 280-0330.

Drop-lid secretary desk, 3 drawers, unfinished hardwood, \$50. 334-1934. Round chopper block table, four vinyl chairs, brass base, \$200. Debbie, x30169 or 554-7442.

Wanted

Want to buy electric trains. Don, x37832 or 996-1425.

Want roommate to share 3-2-2 house in Friendswood, W/D, cable, microwave, household privileges, non-smokers, \$245/mo., all bills paid. Michael, x38169 or 482-8496.

Want tenor trombone, small bore, will buy or trade King 3B, F-trigger trombone. Milt, x35428 or 488-5903.

Want 7' pool table, slate top, good cond. Ed, x32586.

Want men's wet suit, medium size. Jim, x33782.

Want carpool and/or riders from Houston Heights area to JSC Ben, x30755.

Want portable baby crib, mattress, good cond. 996-8807.

Want small high temperature ceramic kiln. Isabel Konradi, 532-3342.

Want one set of mounted steer horns for display. Charles, 538-3273.

Want to trade a '83 Honda Accord, fully equipped, ex. cond., for a similar year Bronco II, S-10 Blazer, Jeep or Isuzu Trooper II. Rich, x32831 or 532-1673.

Want to trade baseball cards; I have a large collection from the 60s. Rick, 280-0330.

Photographic

Nikon F Camera body, \$160. Carrington, 488-3941.

Musical Instruments

Ventura 5-string banjo, case, ex. cond., \$220. Ernie Smith, x36893 or 485-2287.

Alvarez classical guitar, ex. cond., \$110. Ernie Smith, x36893 or 485-2287.

Baldwin Overture organ, "The Fun Machine", bench, manuals, 2 keyboards, 13 pedals, ex. cond., \$1,200. Tom Clark, x39842.

Yamaha SK20 Symphonic Ensemble Synthesizer, 61 keys, 7-note-polyphonic organ, string, poly synthesizer sections, vibrato/tremolo, ensemble effects, ex. cond., \$400. Richard, x31620.

Banjo, case, book, good cond., \$60. 538-1845.

Pets & Livestock

Lab puppies, 1 choc., 5 black, from hunting stock, 6 wks. old, shots, wormed, \$50 deposit will hold, \$150 ea. Beverly, x34015 or 559-2112.

AKC Basenji pups, show quality, 1 male, 2 females, born 1/4/87, \$350 ea. Kerry, (512) 472-2717.

Three AKC male miniature schnauzers, 6 wks. old, extra small, \$250. 482-1505.

AKC black Lab, female, 4 mos. old, shots, house broken, \$100. Ralph, 559-1146.

Miscellaneous

Pool table, 34" slate top, accessories, \$300. Beverly, x34015 or 559-2112.

Octagym (multi-purpose rower), \$50. Hirsh table for portable circular saw, \$10; modern couch, chair, coffee table (gray metal, beige fabric), \$100. Mike, x34378 or 486-4983.

Sears workout center and barbell dumbbell, set w/20 weights, 5-15 pads, ex. cond. Myron, x32694 or 482-4778.

Chev. 283 engine, 3 spd. manual transmission, engine partially disassembled, needs rings, valve work, rods, crankshaft, camshaft, pistons, good cond., \$100. Bob, x39079 or 488-5881.

Space Station, JSC Space Shuttle team jackets. 480-1746.

8' long fluorescent light fixtures, x39287.

Gympac 200 weight unit, wall mounting, \$150, ex. cond. Bill, x32602 or 326-2326.

Buy or sell U.S. coins circulated/uncirculated, Morgan dollars to Lincoln cents, mint sets, proof sets. 488-4859 or 282-3584.

Remington model 742 automatic 30-06, \$275. Leupold, 3 x 9, \$350. Don, x30419 or 331-4059.

Golf clubs, Confidence II, stiff shafts, match set of 1970 vintage 1-SW, \$250 OBO; golf woods, 1, 3 & 5 personal make, persimmon heads, extrastiff graphite shafts, \$200 OBO. Will, 280-5225.

Golf clubs, 3-9 irons & P.W., 1, 3 & 5 metal woods w/covers, golf bag, \$100. Bobby, x39491 or 991-2396.

Chainlink fence material, 150', 5' high fence, post caps, top rails, walk gate, clamps & bolts, \$175. Linda, x33844 or (409) 925-4862.

Parts, '54 Rambler car, BO, 72 Honda 554 motorcycle; '64 18' Sterncraft boat

w/trailer. 280-2444 or 488-0275. Sanyo car stereo AM/FM/tape w/Dolby, AMSS, high-power amp., etc., 2 80W 6 x 9 spkrs., \$155 OBO. New Goodyear steel belted radial. Jansen, 486-8528.

25" Magnavox console television, BO. Rodney, x35543 or 538-1423

Garage sale, household items, clothes, books, tools, baby & infant clothes, crib, lawn mower. 9-5. Sat. & Sun., Feb. 6, 7, 15711 Brook Forest Drive. Edwin Samfield, 488-8273.

Credenza, black metal w/wood grained top, 60" x 20", sturdy, ex. cond., \$75. x34044 or 280-0909.

Wildlife art prints, 22" x 28", signed, must see to appreciate detail and quality, x34044 or 280-0909.

New test equipment, leader 250 Mhz counter #LDC-8235, \$85; leader sweep marker generator #LSW-333, \$155; leader FM stereo signal gen #LSW-333, \$70, global specialties #3002 autoranging capacitance meter, \$55. Tom Clark, x39842.

4 wheels w/covers for '84 Honda Accord, \$50/set, '84 Honda Accord service manual, \$10. Joe, x33559 or 996-1667.

2 pairs of stereo speakers, wood grain finish, \$15 pr. Brad, x31678 or 338-1252.

Motorcycle helmet, full-face, black/grey, x-large, \$40. 480-4434.

Ski Heavenly Valley at Lake Tahoe, 2 BR condo, \$300 for week Feb. 22-29. Tom, x38298 or 488-4089.

(4) '78 Camaro 14" gold & chrome rims, 5 lugs ea., 2 radial tires, ex. cond., \$50; 2 big dune buggy tires, gold & chrome rims, \$30 ea.; '74 Pontiac Grand Am transmission, ex. cond., \$50; glass pack muffler, \$5; 2 tow bars, \$5; 4 BL Holley carb, \$5; 4 BL stock air cleaner cover, \$3. Bev, x30364.

Dynastar Riva 180 cm snow skis, Allsop poles, ski-tote w/lock, \$100. 538-1845

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Cookin' in the Cafeteria

Week of February 1 - 5, 1988

Monday — Cream of Chicken Soup; Beef Burgundy over Noodles, Fried Chicken, BBQ Sausage Link, Hamburger Steak (Special); Buttered Corn, Carrots, Green Beans. Standard Daily Items: Roast Beef, Baked Ham, Fried Chicken, Fried Fish, Chopped Sirloin. Selection of Salads, Sandwiches and Pies.

Tuesday — Beef Noodle Soup; Baked Meatloaf, Liver & Onions, BBQ Spare Ribs, Turkey & Dressing (Special); Spanish Rice, Broccoli, Buttered Squash.

Wednesday — Seafood Gumbo; Broiled Fish, Tamales w/Chili, Spanish Macaroni (Special); Ranch Beans, Beets, Parsley Potatoes.

Thursday — Navy Bean Soup; Beef Pot Roast, Shrimp Chop Suey, Pork Chops, Chicken Fried Steak (Special); Carrots, Cabbage, Green Beans.

Friday — Seafood Gumbo; Broiled Halibut, Fried Shrimp, Baked Ham, Tuna & Noodle Casserole (Special); Corn, Turnip Greens, Stewed Tomatoes.

Week of February 8 - 12, 1988

Monday — Chicken Noodle Soup; Wieners & Beans, Round Steak w/Hash Browns, Meatballs & Spaghetti (Special); Okra & Tomatoes, Carrots, Whipped Potatoes. Standard Daily Items: Roast Beef, Baked Ham, Fried Chicken, Fried Fish, Chopped Sirloin. Selection of Salads, Sandwiches and Pies.

Tuesday — Beef and Barley Soup; Beef Stew, Shrimp Creole, Fried Chicken (Special); Stewed Tomatoes, Mixed Vegetables, Broccoli.

Wednesday — Seafood Gumbo; Fried Perch, New England Dinner, Swiss Steak (Special); Italian Green Beans, Cabbage, Carrots.

Thursday — Cream of Chicken Soup; Turkey & Dressing, Enchiladas w/Chili, Wieners & Macaroni, Stuffed Bell Pepper (Special); Zucchini Squash, English Peas, Rice.

Friday — Seafood Gumbo; Baked Cod, 1/4 Broiled Chicken w/Peach Half, Salisbury Steak (Special); Cauliflower au Gratin, Mixed Vegetables, Buttered Cabbage, Whipped Potatoes.